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Anexa nr.6

## ABSTRACT OF THE HABILITATION THESIS

**TITLUL: MODERN APPROACHES IN REGENERATIVE MEDICINE AND PRECISION ONCOLOGY**

Habilitation domain: *MEDICINE*

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Basic research in the medical field is extremely important because it leads to the advancement of knowledge in human health through new, clear, and evidence-based information regarding the mechanisms of various diseases and the risk factors that can influence the population health. Due to its interdisciplinary nature, basic medical research complements or supports other areas of medical research, offering new perspectives and efficient study directions for prevention, prognosis, and treatment. Thus, its impact on human health is considerable.

The habilitation thesis, titled "Modern Approaches in Regenerative Medicine and Precision Oncology," offers a synthesis of the results from the scientific activity, also highlighting the professional and academic achievements obtained after obtaining the Ph.D. in Biology in 2005. This title was obtained after defending the doctoral thesis entitled "In Vitro Proliferative Potential of Hematopoietic Stem Cells in the Presence of Growth Factors."

Due to the ability of stem cells to contribute to the regeneration of damaged tissues, interfere in liver, hematopoietic, and neuronal regeneration processes, and serve as an experimental model in cancer research, they become the basis of many biomedical research directions. Primary aspects related to sources of hematopoietic stem cells, isolation, and cultivation methods were addressed throughout my doctoral thesis. Later, my postdoctoral research continued in this line, focusing mainly on the potential of stem cells to differentiate into multiple cell types, with numerous implications and practical benefits, especially in regenerative medicine, tissue engineering, and also oncological diseases field.

Benefiting from experience in the field of stem cells, I later advanced a related research area, that of tumor stem cells, which are considered responsible for the recurrence and metastasis of tumors due to their increased resistance to conventional treatments. The developed projects investigated the role of tumor stem cells in the development and progression of gastric cancer, with the goal of identifying therapeutic strategies targeting their elimination. These studies are important





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for understanding the functioning of tumor stem cells and for developing targeted therapies that contribute to their elimination and prevent metastasis formation.

Continuing the research direction in the field of cancer, I later developed a series of studies focused on gastrointestinal cancers, with three main directions: (1) Identifying new biomarkers in gastrointestinal cancers (KRT17, Serpin-1, ETS-1, soluble PD-L1, collagen family, and other tissue matrix metalloproteinases) involved in the progression and metastasis of cancers, with the potential to become new targets for anti-tumor therapy; (2) In vitro and in vivo validation through gene expression blocking experiments and functional investigation of S100A2, KRT17, Serpin-1, ETS-1 as potential molecular targets for therapy in gastric adenocarcinoma by significantly reducing angiogenesis and tumor growth; (3) Using liquid biopsy to identify soluble prognostic biomarkers, such as PD-L1, with applications in monitoring tumor growth and anti-tumor therapy efficacy.

Another important research direction was developed during the period marked by the COVID-19 pandemic, when, together with researchers from the Stefan S. Nicolau Institute of Virology, alongside our fundamental and applied research activities in specific fields, we supported the national public health system. Thus, we were actively involved in both SARS-CoV-2 testing and various projects initiated by national authorities. One such project aimed at evaluating the post-vaccination immune status and the dynamics of anti-SARS-CoV-2 antibodies in the vaccinated healthcare personnel from Bucharest. The studies provided important information regarding the efficiency of vaccination, kinetics, and duration of the humoral and cellular immune response post-vaccination, as well as data on the occurrence of asymptomatic infections post-vaccination.

All these researches, along with other studies conducted after the completion of the doctoral thesis, which are not included in the habilitation thesis, have resulted in numerous scientific papers published in full and presented at various scientific events. The studies have been the subject of research projects in which I was involved either as project leader or as a member of research teams.

The habilitation thesis also presents the professional achievements obtained in scientific research within the Stefan S. Nicolau Institute of Virology of the Romanian Academy, with a focus on education and professional training, dissemination of results obtained in the main research directions developed, professional prestige, and research management activities.

The following subchapter of the habilitation thesis details the academic achievements, highlighting the role of mentorship in training students, young specialists, researchers, and PhD students. It also emphasizes contributions to the organization of professional training courses designed to support the development of necessary competencies in the field.

The last section of the habilitation thesis presents career development plans from a scientific, professional, and academic perspective. Thus, it details strategies for continuing fundamental research and exploring new research directions such as cancer immunology, maintaining professional activity at the highest performance standards, as well as measures considered for future PhD thesis coordination.